

**REMARKS**

Claims 1-20 are pending. The applicants respectfully request reconsideration and allowance of this application in view of the above amendments and the following remarks.

The drawings are objected to as allegedly using the reference character 31 to refer to different elements. However, applicants note for clarification that the reference character 31, as is clearly explained, for example, on page 10, line 21 and 22 of applicant's specification, refers to a monopole antenna constructed from a linear conductor bar 31. Alternatively, the linear conductor bar 31 is referred to as the monopole antenna 31, as can be seen for example, on page 11, line 13. Therefore applicants submit that reference character 31 is not used to refer to different elements but rather is used to designate the same element, e.g. a monopole antenna constructed from a linear conductor bar.

Applicants note for clarification, that reference is also made to linear *metal* bars 5, for example as recited in claim 2, which, as is described in the specification and shown the drawings, are used to couple small metal plates as can be seen, for example, in Figs. 12, 19-21, 36, and the like. However, it should be noted that the linear metal bars 5 are different from the linear conductor bar used to construct the monopole antenna 31 as would be appreciated by one of ordinary skill in the art. Accordingly, since the relationship between monopole antenna 31 and the linear conductor bar 31 are clearly explained, applicants do not believe any drawing changes are necessary with regard to this objection.

The drawings are further objected to as failing to show, the claimed first portion and second portion of a linear conductor bar as recited for example in claim 19. The applicants respectfully submit that Figures 12 and 18-21 clearly show a linear conductor bar with a first portion, e.g. inverse L shaped portion 21 and a second portion monopole antenna 31 as clearly

described for example, on page 14, lines 18-23 of applicants's specification. Therefore, applicants do not believe any drawing changes are necessary with regard to this objection.

Claim 1 is objected to, as best understood, for containing reference to "on the surface" rather than "above the surface," which the Examiner deems to be correct. Applicants have amended claim 1 to clarify that it is the band gap that is being referred to as being provided on the surface of the substrate sheet as intended. It is requested that the objection be withdrawn.

Claim 1 is rejected under 35 USC 112, second paragraph, as being allegedly indefinite. Without acknowledging the propriety of the rejection, claim 1 is amended to improve the clarity thereof and not for reasons related to patentability.

The Examiner has indicated that it is not understood how the second antenna works with the first antenna. Applicants submit that there is no legal support for requiring the claims to present a detailed recitation of how the invention works, only that one of ordinary skill would understand *within a reasonable degree of certainty* what is being claimed. Applicants note that the Examiner has admitted that the concern with regard to claim 1 is improving its clarity. Therefore an objection would have been a proper manner of addressing issues related to clarity.

However, to expedite prosecution and to improve the clarity thereof, claim 1 is amended herein to recite that the second antenna is coupled to the first antenna at a connecting point, and that the first antenna and the second antenna are installed on the substrate sheet. It will be appreciated that the added language finds ample support in applicants' specification. For example, the coupling of the first antenna and the second antenna at a connecting point, such as a branching point, is described in accordance with one exemplary embodiment at page 14, line 23. Other exemplary connection points are described elsewhere in the specification such as, for example, at page 21, line 23.

Claims 1-12 and 18-20 stand rejected under 35 USC 103(a) as being unpatentable over Sievenpiper et al., U.S. Patent No. 6,433,756 (hereinafter “Seivenpiper ‘756”) in view of Nichols et al., U.S. Patent No. 5,831,577 (hereinafter “Nichols ‘577”). The applicants respectfully request that this rejection be withdrawn for the following reasons.

Applicants first note that no evidence has been provided of a suggestion or motivation contained *in the references themselves*, to show that one of ordinary skill in the art would have been guided to make the combination. The motivation given by the Examiner is for “reducing or increasing a second monopole antenna length in order to provide a frequency band lower or higher side than the first frequency band.” Given that the Examiner is using terms taken directly from the applicants’ specification, it is submitted that improper hindsight reasoning is being used to combine the references rather than a suggestion or motivation from the references themselves, which is what is required.

Further, as noted in the previous response, a close review of Seivenpiper ‘756 reveals a teaching away from incorporating a second antenna resonating at a frequency outside the band gap. Thus, rather than containing a suggestion or motivation to modify the first antenna taught in Seivenpiper ‘756 with some teaching of a second antenna, Seivenpiper ‘756 specifically limits the configuration to an antenna operating in a first band only.

For example, Seivenpiper ‘756 explicitly describes that if circular or horizontal polarization is required, the vertical monopole *is not a viable option* (see, e.g. col 3, line 30). Accordingly, Seivenpiper ‘756 can be said to teach away from the claimed invention where a first antenna and a second antenna are provided on the same substrate for resonating *at different frequencies* as claimed, e.g. within and outside a band gap. Seivenpiper ‘756, at best, describes that more than one antenna can be used to provide a radiation pattern, but only *within the same*

**frequency band** (see, e.g. col. 5, line 19 and 20). Therefore, not only does Seivenpiper '756 specifically fails to disclose a second antenna as tacitly admitted by the Examiner, Seivenpiper '756 specifically teaches away from a modification of the described configuration to add a second antenna by describing that, contrary to prior art use within the band gap, the antenna 10 is operated in a frequency in the LA region to improve low angle radiation (see, e.g. col. 8, line, 49, line 54, and line 59) and that more than one antenna could be used, but only within the same frequency band.

It should further be noted that the frequency band of the antenna configuration in Seivenpiper '756 is specifically designed with the LA region of the Hi-Z surface in mind. Accordingly, operating outside these regions as would be required by the modification of the antenna in view of Nichols '577, would render the invention of Nichols '577 inoperable since the LA region of Seivenpiper '756 does not encompass the operating frequencies taught in Nichols '577.

Applicants further note that although Nichols '577, at best, describes a GPS and a DGPS antenna, Nichols '577 fails to teach that a substrate has a band gap and that one of the antennas resonates at a frequency in a band gap and the other outside a band gap. While the Examiner is clearly relying on Seivenpiper '756 as teaching the claimed band gap, the applicants contend that since Nichols '577 fails to teach or suggest the claimed band gap, that Nichols '577 necessarily fails to teach or suggest any relation to a band gap and resonances of the GPS and DGPS antennas. Thus Nichols '577 fails to describe how a configuration including a second antenna could be attained in connection with a first antenna and a band gap. As noted, Seivenpiper '756 also fails to describe how a second antenna resonating outside the band gap could be incorporated into the configuration.

Applicants submit that one of ordinary skill in the complex art of antenna design would clearly understand that the claimed configuration could not be achieved merely by bodily incorporating an arbitrary second antenna such as one described in Nichols '577 into the configuration of Seivenpiper '756 without being presented with great difficulties.

Accordingly, applicants submit that a *prima facie* case of obviousness has not properly been established for at least the following reasons: 1) insufficient evidence has been provided to support and motivate the applied art combination; 2) Seivenpiper '756 teaches away from incorporating a second antenna resonating in a frequency band outside the band gap; 3) Seivenpiper '756 fails to provide any teaching of how to incorporate such a second antenna; 4) Nichols '577 fails to teach sufficient relation between antennas and a band gap to support the proposed modification of Seivenpiper '756; and 5) the inventions of Seivenpiper '756 and Nichols would be rendered inoperable if the proposed modification was made in an attempt to arrive at the invention as claimed.

Therefore it is respectfully requested that the rejection of independent claim 1 be reconsidered and withdrawn. Claims 2-12 and 18-20, by virtue of depending from claim 1 are allowable for at least the reasons set forth herein above with regard to claim 1. It is respectfully requested that the rejection of claims 2-12 and 18-20 be reconsidered and withdrawn.

The indication of allowability with regard to claims 13-17 is noted with appreciation. Applicants reserve the opportunity to rewrite these claims pending the outcome of further prosecution.

In view of the foregoing, the applicants submit that this application is in condition for allowance. A timely notice to that effect is respectfully requested. If questions relating to patentability remain, the examiner is invited to contact the undersigned by telephone.

If there are any problems with the payment of fees, please charge any underpayments and credit any overpayments to Deposit Account No. 50-1147.

Respectfully submitted,



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